



# Web On-The-Go

A Preview of The Way of Living  
in the Wireless Web World

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The Way of Living  
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## Preface

### **Economist vs. Innovator:**

Peter Ferdinand Drucker's first book was entitled *The End of Economic Man*, published in 1939. In this book, Drucker wrote the following paragraph:

"It is what Joseph Schumpeter (1883 – 1950) did when he identified the "innovator" as the social force that turns economies upside down; the innovator does not behave economically, does not try to optimize, is not motivated by economic rationale – he is a social phenomenon. It is what this book tries to do."

If you watch a football, soccer or basketball game, you will see many different players enter the arena. Each player usually does one of two things during the game: Some might try brand new moves, while others might introduce enhancements to the existing strategy. All players take risks. They play hard and try to win every game.

When you watch the game on television, you also may see a few well-dressed people sitting around a table in a comfortable room, making commentaries about the game. You might hear these commentators offer their ideas such as: "Michael Jordan should have gone a few steps in front and then tried to shoot the ball. That would have been the perfect shot. Had he done that, the Chicago Bulls would have won the game."

People listening to these sports commentaries may agree with the analysis. Listeners might believe a certain commentator to be a genius when it comes to sports strategy, but we don't for a moment presume that these commentators should then leave their comfortable chairs and take Michael Jordan's place on the team.

That would be ridiculous. We know that the commentators are not the Players. Players keep their bodies and minds fit to play the game. Players go to the game with new strategies or enhanced existing strategies, every time they enter the field. Players take risks and know the challenges. They don't succeed all the time, but they still get up and play the next game with a strong determination to win.

Economists are not players. In this analogy, economists are very much like sports commentators. They can only make comments on the players' performances, and of course they are only able to comment on the past performances of the players. Their present statement is then always based on what has already happened. Economists have no idea about the present activity and potential future results. They must live in the past.

And yet the economists are so incredibly influential. Their statements stay in the public mind as powerful indicators of what is actually happening.

When economists make a comment such as: "The Economy is in Recession," then people panic. The stock market plummets. When economists make a statement such as: "The Economy is in Depression," people jump out of windows.

Even the most innovative organizations in the world are now making statements like, “We are not immune from the economic depression and we view the situation as pretty dire.” The CEOs are making very grim public remarks about the economy.

But the truth is, these economists are much like sports commentators. They are not players in the actual game. They are talking about the past.

Then who are the players who are actually making things happen now?

The players are the innovators.

Innovators build the future now. Innovation creates wealth.

The innovator is the social force that turns economies upside down. The innovator does not behave economically, does not try to optimize, and is not motivated by economic rationale. Innovator is a social phenomenon.

Only Innovation creates wealth, not economists’ statements such as “Recession” and “Depression.”

That is what Peter F. Drucker tried to do in his first book. He tried to free the society from the clutches of economists and their fearful statements such as “Recession” and “Depression.”

In almost all of his books, talks, and lectures throughout his entire life, Drucker tried to shift the focus away from these scary economic statements, and instead replace them with statements such as: “Innovation” and the “Innovative Opportunities.”

But even today, our focus remains on the present economic statements being made, and these statements are based on past reports from various sectors of the economy such as the housing sector, job sector and GDP.

If we remain stuck in the past, completely occupied with present economic statements, our future will remain in recession and depression.

The truth is,

The Economy is not in Recession.

The Economy is not in Depression.

It is the Innovation that is suffering.

Right now, the Innovation is in Recession. The Innovation is in Depression.

Organizations have ceased all Innovation. Organizations have stopped searching for Opportunities for Innovation.

The Innovators are holding back. The economists are at the forefront and continuing to scare people with their terrifying statements.

We do not presently need more economists. We DO need more Innovators.

Innovators are the social force that will turn the economies around.

The intention of this book is to shift our focus from the economists to the Innovators and Innovation, in particular in the field of wireless web.

### **Only Innovation Creates Wealth:**

According to Drucker, Innovation is not a technical term belonging strictly to the field of science or technology. Innovation is, rather, an economic and social term, pointing towards a shift in the overall economic or social environment of the day. This shift could include changes in people's behavior as producers, consumers, students, teachers, etc...

He goes on to explain that rather than creating new knowledge, innovation actually creates new wealth or new potential for action. Innovation could be thought of as the exploitation of new ideas. If this is true, then most innovation will have to stem from the places that are already rich in manpower, brainpower and money, namely existing businesses, schools and public service institutions. Drucker believed that innovation was absolutely pivotal if a society hoped to maintain and create high quality jobs and keep successful businesses afloat. Obviously then, our challenge now is to create a society where innovation is put first, in businesses, schools and governments. Governments must play a key role in this bend towards innovation, but they can't do it alone.<sup>i</sup>

If we continue thinking in these terms, then in essence, the economic stimulus package initiated by Obama's administration, is meant simply to jump-start our society's innovation.

The U.S. Congress recently put aside \$4.7 billion in order to establish a Broadband Technology Opportunities Program. This program will offer awards to eligible entities in order to develop and expand broadband services to unserved and under-served areas. Awards will also be given out that will improve access to broadband by public safety agencies.

\$250 million of this money is set aside for innovative programs that intend to adopt sustainable broadband services. At least \$200 million will be set aside to upgrade technology and capacity at public computing centers, including community colleges and public libraries. \$10 million will be a transfer to the Office of Inspector General for the purposes of BTOP audits and oversight. Up to \$350 million of the BTOP funding is designated for the development and maintenance of statewide broadband inventory maps.<sup>ii</sup>

As we move into this next era, and this new money for broadband services becomes available, it is extremely important to remember the importance of innovation. Peter F. Drucker stressed the importance of certain principles of innovation that are of the utmost relevance today:

1. "Purposeful, systematic innovation begins with the analysis of the sources of opportunities."
2. "To be effective, an innovation has to be simple, and it has to be focused."
3. "Effective innovations start small."

4. “The successful innovation aims from the beginning to become the standard setter, to determine the direction of a new technology or a new industry, to create the business that is – and remains – ahead of the pack.”

5. “Innovation is work rather than genius. It requires knowledge. It requires ingenuity. And it requires focus.”<sup>iii</sup>

### **Innovative Opportunities:**

Organizations must execute conscious and purposeful searches for innovative opportunities. This book is meant to be used as a guide for organizations to help them pinpoint some of these opportunities. It includes practical examples that will encourage any organization to identify key opportunities for innovation.

Once an organization has identified an attractive opportunity, then the company will still need to take a leap of faith and imagination in order to arrive at the right response.

Organizations first must know what Innovation means. As I mentioned earlier, Innovation is not science or technology, but Value. Innovation is not something that takes place within an organization, but rather a change outside. The measure of innovation could very well be the impact of the innovation on the environment. Innovation in a business enterprise must therefore always be market-focused.

Bell Labs invented the transistor technology. But the scientists there saw Innovation from a strictly technological vantage. They failed to understand the value of their innovation. These scientists told Sony Akio Morita, who approached them with a request to use this technology, that the transistor was only good for use in the hearing aid.

Had they asked Sony Akio Morita about his plans for the use of the transistor, perhaps Sony might have shared his vision about the mobile radio. Who knows? Maybe both Sony and Bell Labs would have come together to manufacture the mobile radio. Had this happened, those scientists at Bell Labs would have earned a great deal of money off their transistor innovation. But the truth is, the scientists didn't make the money. Sony did.

This book helps the engineers, scientists and technologists to pinpoint a specific potential technological application, and at the same time challenges these people to actually build these applications. If innovation is successfully brought about, it is likely to turn into a major product or process, a major new business, and a major market.

To manage innovation, a manager does not need to be a technologist. Indeed, the first-rate technologist is rarely good at managing innovation. He is so deeply engrossed in his specialty that he rarely sees development outside of it.

Similarly, the innovative manager need not be an economist. The economist can concern himself with the impact of innovation only after the product has become a massive force.

The innovating manager must be able to anticipate vulnerabilities and opportunities. He or she needs to study innovation and to learn its dynamics, its pattern, and its predictability.

The innovative manager converts impractical, half-baked, and wild ideas into concrete, innovative reality. In the innovative organization, the top management listens to ideas and takes them seriously.

Top management in the innovative organization knows that new ideas are always impractical. Top management also knows that it takes a great many silly ideas to give birth to a fantastic one. In the early stages there is no way to differentiate the silly ideas from the ones that will eventually change our lives. Both look equally impossible or equally brilliant.

Top management in the innovative organization should generally encourage ideas and continuously ask how they can make ideas practical, realistic and effective.

Top management should organize itself so that it can think through even the wildest and apparently silliest idea for something new, to the point where the feasibility of the idea can be appraised.

Top management in the innovative organization is the major drive for innovation. It shall use the ideas in this book to stimulate vision and then work to make these new ideas a prominent concern of the entire organization.

Resistance to change is grounded in ignorance and in fear of the unknown. However, if change is seen as opportunity, then there will be no fear.

One way to organize innovative units within a large business might well be to group them together into one innovative group. This innovative group shall report to one member of top management who has no other function but to guide, help, advise, review, and direct the innovating team at work.

In this wireless web innovation, the group may consist of software developers, wireless infrastructure professionals, marketing professionals and government liaison people. The team must consist of cross-functional professionals. Together they can take the wild, silly ideas and can come up with a new innovative product or process.

For innovative strategy, the device must be: “New and Different.” The base of innovative strategy must include the elimination of the old technology that no longer serves. Innovating organizations should not spend time or resources defending yesterday. Indeed, systematic abandonment of yesterday can free the resources, especially the most important resources of them all— capable people, for work on the new. Unwillingness to do this could very well be the greatest blockade to innovation in existing large businesses.

The innovative organization resists stagnation rather than change. This book helps the organization to be innovative. This book itself is an innovator. The “innovator” is the social force that turns economies around. The innovator does not behave economically, does not try to optimize, and is not motivated by economic rationale – he is a social phenomenon.

### **Communication and Transportation:**

Human beings need two kinds of freedom:

The first type of Freedom needed is the ability to know, read, speak, write, watch, listen and express. This need is fulfilled by communication tools.



The second type of freedom humans need is the ability to physically move around anywhere on planet Earth. This is fulfilled by the Transportation facilities.

In this book, human beings are granted both freedoms. Functioning systems of communication and transportation together, offer total freedom to the human being.

### **Audiences:**

Scientists, engineers and technologists have an abundance of knowledge on the latest technology as well as the appropriate skill sets, but they have no idea about the customer's needs. This book helps them to identify the customer's needs so that they can build applications to meet the needs of the customers.

The engineering team shall suggest this book to the marketing team of an organization. The marketing team shall research the customer's needs and requirements in complete detail and then provide the engineers a challenge to their knowledge and skill sets. Engineers love challenges.

The marketing team shall suggest this book to government agencies and government executives, policy makers and politicians. This will help them to make decisions such as providing wireless infrastructure throughout the city or state.

When the Internet was launched, it was mainly used for email and then later for Instant Messenger. The business enterprises, such as, FedEx, Bank of America, Pizza Hut, Airlines, Wal-Mart – had no idea about how best they could make use of the web. All they had a simple HTML page about their business.

Later, once they are convinced about the availability, safety, security of the web, then the business enterprises started exploring the way they could make the best use of the web. FedEx have started providing the tracking of the packages; Bank of America with on-line banking; Pizza Hut with store location and on-line ordering system; Airlines with reservation; Wal-Mart with on-line shopping; and government provided so many services, especially the visa applications, green card processing, on-line status and so on.

Likewise, right now iPhone, Google Android and other Mobile Internet Devices are mostly used for email, chat, YouTube and other social networking. Once the business enterprises are convinced about the availability, safety and security of the Web On-The-Go, they will start looking for the opportunities to make the best use of the Mobile Web to serve their business customers.

Finally, this book will help the general public to prepare for the future. It sets high expectations of the Web on-the-go infrastructure.

In this book, we don't discuss the technology or the science behind the wireless web. Rather, we highlight the value of Innovation, and web on-the-go

### **Motivation for the Book:**

Around the end of 2007, the industry was speculating for the Google phone. But Google, instead of making a phone, released the open platform called Android, designed for mobile devices. In order to

promote the Android, Google announced the developer challenge. They asked for people to submit proposals for applications based on the Android platform.

I was inspired with the challenge and began thinking of what kind of applications should be built. At that time, I came up with many innovative ideas. Instead of building any one application, I went on to prepare a document with illustrations of the applications that I had begun to envision. That document is the base and inspiration for this book.

Traditionally, innovators like Arthur C. Clarke expressed their new ideas by publishing science fiction novels. This book is *not* science fiction, but it *is* filled with unique innovations that do not yet exist.

### **Acknowledgments:**

It took me some time to switch gears from software development to actual publication of a book. I was looking for professional support in creative writing, editing, formatting and the creation of illustrations. Step by step, I built a team of experts. Special care has been taken to build a team with social and political knowledge, as well as expertise in their given fields.

This global team includes Meg Hamill in Northern California, Christine Frank is in St. Louis, Missouri and Pippa who lives in UK. All of these individuals helped to make this project a success.

I want to thank and appreciate Meg Hamill for her creative writing expertise. I want to thank Christine Frank for her expertise in editing and book layout. I want to thank Pippa for creating the fantastic illustrations that accompany these stories.

### **My Family:**

While I was consulting at Google, more than their technology, their kitchen and food inspired me a great deal. Google is like a Willy Wonka Chocolate Factory for software professionals. Later, I thought of entering into the food business. Food business is good for all economic conditions. But my wife Sudha said that food business was her future plan and asked me to look out for something else.

Having worked in the computer industry for nearly 25 years, and having witnessed the technology growth that accompanied it, I was convinced that now was time to take this technology to the people and society at large. So I told my wife that I was going to work on publishing a book on innovation. I would like to thank my wife for offering me total support on this new venture.

My daughter Luxwin had been suggesting that I buy the Google G1 phone. However I kept postponing this decision to get a new phone. One day, accidentally, my daughter stepped on my old phone's charging wire and my old phone fell down and broke into two pieces. That accident was an innovative opportunity for me. I bought the Google G1 from T-Mobile. Having the actual working phone on hand, really helped me to come up with the ideas found in this book.

A year ago, all of a sudden my cellphone bill doubled. After investigation, I found that my son Ashwin had subscribed for a joke-a-day service, after watching a commercial on television. For a few lines of text each day, the cell phone companies were charging me an exorbitant amount of money. This didn't seem just to me. I decided that it was time for the systematic abandonment of the cell phone. Now I have the Google G1 phone service from T-Mobile. My son has total freedom. He can browse the

Internet on-the-go using this new innovation. He also downloads tons of applications from games to creative arts.

### **Open Mind and Open Ideas:**

With so many innovative ideas, I had two choices.

One choice was to be greedy and to close my mind. With a closed mind I might have come up with one or two ideas, then patented my idea to make millions.

The other choice seemed to be to open up my mind, be responsible and share my ideas. When I am open, responsible and sharing, then millions of ideas seem to fly out of my open mind. By publishing those ideas in this book, I decided I could still make millions.

Obviously, the second choice won out.

The founding fathers of America didn't patent the constitution of United States of America. Peter Drucker gave out a myriad of innovative ideas in his books. Arthur C. Clarke didn't feel the need to patent his ideas. Let me follow in the footsteps of these visionaries and dedicate this book to all of the innovators who have helped build this great world.

## Chapter 1

### Introduction

*“People only see what they are prepared to see.”<sup>iv</sup>*

Ralph Waldo Emerson

Human beings have created, and are living within, a complicated web of politics and invention, scientific discovery, and architectural wonder. Every time we step into a building, turn on the car, phone a friend, or cast a fishing line, we are interacting with the physical manifestation of someone else’s dream. Every tool that we use, every human-made construction, began as vision, imagination, and pure potential within the human brain. Vision is, however, simply one aspect of the equation. Visions must be supported by innovation, conceptualization, and hard work, if they are ever to become tangible systems and objects in our human society.

Today we live in a time when technological advances are happening so quickly that it truly is difficult to keep up. It is almost unfathomable to imagine what the future will hold, what visions are being kindled right now in the minds of ordinary citizens, scientists, engineers, teachers, and poets all over the world.

A recurrent theme throughout history seems to be that paradigm shifts in human consciousness are extremely difficult in the moment, yet also essential for progress. This is true in the technological realm just as much as it is true in the philosophical realm. Being able to comprehend the potential of new technology has always been challenging. Many engineers and inventors could never have imagined the ways in which their invention would be practically applied in the world. For example, when Guglielmo Marconi invented the radio, he assumed it would be used for person-to-person communication. Today radio broadcasting allows large populations of people living in the far corners of our Earth to all hear the same news. Surprisingly, Alexander Graham Bell invented the telephone while working to further assist deaf people, and thought his technology would be used to broadcast music concerts.

It can generally be said that scientists and engineers are somewhat limited in pinpointing the potential applications for their new technology. Perhaps this is not really even their job. At some point, however, someone must step in who intimately understands developments in the technological front and yet can also envision the potential future use of that technology. It is up to this person to find a way to bridge existing technology with a vision for how to apply it in new and as-yet undiscovered ways.

A similar situation is happening right now in the field of mobile Internet technology. Many of us have easy access to computers and the Internet at home. The Internet is overloaded with fantastic information. However, this information is oftentimes not available when we are traveling and on the road. Today we truly live in a global society. There are many jobs that require us to travel great distances and spend extended amounts of time away from family and the conveniences of domestic life. Families are split apart and many of us find ourselves traveling thousands of miles just to be close to our kin. Even if we live close to our job and our family, we inevitably spend time each day away from our computers and easy access to the Internet.

With so much mobility in our society, with so many of us traveling with greater and greater frequency, I would suggest that it is indeed a ripe time to make mobile Internet technology not only commonplace, but easy to use, affordable, and beneficial to our communities. The proper technology exists. This book

will outline my thoughts and ideas on why mobile Internet technology is important, and how to go about putting these systems in place.

In order to do this, I will explain to the best of my ability the evolving technology found in Mobile Internet Devices, Internet Everywhere, and Open Web. Once I have laid out the details of how this technology works, I will demonstrate the potential, as I have envisioned it, for Mobile web applications and services. I will do this by showing how this technology can be applied in a variety of specific life situations. My hope is that through writing this book I will be able to bridge the gap between existing mobile Internet technology and practical applications for this technology that do not yet exist.

...

Let's begin by taking a moment to look back over our human love affair with technology and invention. Our history is a rich patchwork collaboration among great visionaries, inventors, and engineers. Each generation does its part to further technological advancements and quality of life for the next. Countless times in our past, we have found ourselves with great technology available, and yet without a vision for how to apply it in the world. Oftentimes it takes the unplanned collision of one person's technological breakthrough with another person's unrelated vision in order to make these giant leaps in human technological evolution. In the pages that follow I will describe some of the key characters and companies involved in two very important breakthroughs in human history: putting a man on the moon, and the creation of the transistor radio.

One could argue that it is never a single person, or a single moment in history, that allows a particular vision to come to fruition. Rather, that each technological advancement follows thousands of years of human ingenuity and progress. Before 1969 there was a long and winding chain of fantastic human minds that led us to put two men on the moon. I will not attempt to start at the beginning of this chain, as that might prove to be an impossible task; instead, I'll start with a man widely referred to as "the greatest genius ever."

One of the greatest visionaries ever known was Leonardo da Vinci, born in Vinci, Italy, near Florence. Leonardo cultivated, in his life, a new way of thinking about machines. He developed the idea that if he could gain an understanding for how individual parts of machines functioned, he could then change these parts and improve them, as well as combine them differently to create entirely new machines. While he was alive, da Vinci was recognized for his engineering skills and as an inventor. As a scientist, he furthered the knowledge base in the fields of anatomy, civil engineering, optics, and hydrodynamics.

Because Leonardo was also an artist (he left us with the *Mona Lisa*) he was able to illustrate his visions on paper with extraordinary clarity. His journals include plans for musical instruments, hydraulic pumps, reversible crank mechanisms, finned mortar shells, and a steam cannon, among myriad others. One concept that appeared and reappeared in da Vinci's journals was that of human flight.

Once, in Leonardo's infancy, he saw a hawk hovering above his cradle. In his own words: "I was in my cradle and a great hawk flew down to me. It opened my mouth with its tail and its feathers struck me several times inside my lips. That bird seems to me now to have pointed me to my destiny." Leonardo felt that he was destined to fly, and he spent a great deal of time and energy trying to do so.

Leonardo wrote a text entitled *Codex on the Flight of Birds*, where he recorded the first known scientific observations about flight. Leonardo sketched illustrations for a glider, a parachute, helical wings, beating wings, bats wings, and a helicopter. The glider plans that he conceived of turned into the world's first plane design capable of flight. It is known as the da Vinci flying machine. Gliders today are closely related to the da Vinci flying machine. Whether or not da Vinci flew his own glider in his lifetime is unknown. Just a few years ago, however, one of Leonardo's glider designs was recreated, using materials da Vinci would have had available to him. The glider flew for a longer distance and at a higher altitude than the famous pilot flight of the Wright Brothers.

Today there is growing interest in replicating da Vinci's models and illustrations. In da Vinci's day, many of the materials to make manifest his multitudes of visions were simply not available, whereas nowadays they are. Oftentimes, however, da Vinci's models are not realistic or complete, which makes replication confusing and does not always lead to a functional creation in the end. However, Leonardo da Vinci was not afraid to see, contemplate, and create what most of the people around him deemed utterly impossible. This fearlessness has led da Vinci to be widely referred to today as the "greatest genius ever."

Leonardo da Vinci has been called a man who "saw the future." He made substantial contributions to both the scientific and artistic worlds, and left a legacy that continues to be of the utmost importance today. One of his most important contributions was his vision of the human being in flight. In the following pages I will contemplate how this initial dream of flight has led our species towards some of the most unimaginable accomplishments, including man walking on the moon.<sup>vi</sup>

Fittingly, let's fast-forward 500 years, and turn our attention to a man who has been referred to as "the Leonardo da Vinci of our time." Arthur C. Clarke made great strides in both the scientific and literary communities, and, like da Vinci, has been celebrated as a man who "saw the future." Clarke played an instrumental role in some of the greatest technological strides in history, and, like da Vinci, used his artistic abilities to do so. Clarke left us with an impressively high stack of celebrated books.

Arthur C. Clarke was a British science fiction author, futurist, and inventor, most well known for the novel *The Sentinal*, adapted for the screen as *2001: A Space Odyssey*, written in collaboration with Stanley Kubrick. Clarke was instrumental in bringing the motif of the alien to the mass market. Clarke expounded on his visions and ideas in more than seventy books of fiction and non-fiction. In 1986 he was named a Grand Master of the Science Fiction Writers of America.<sup>vii</sup>

*2001: A Space Odyssey* might have remained a little-known story lost on the bookshelves, were it not for the adaptation of the book for the screen, and the ability of film to use the themes of space exploration and aliens to captivate the public's imagination. *2001: A Space Odyssey* was written when space exploration programs in the U.S. and abroad were nascent projects budding in the minds of only a few. In order to expand these programs, broad public support was vital, as it would be the tax dollars of ordinary citizens funding these projects.

*2001: A Space Odyssey* won an Oscar for special effects. The realistic picture of space, offered by this movie, sparked the public's interest and imagination in a remarkable way. Kubrick's direction and screenplay demonstrated the intriguing possibilities of space exploration, vividly showing how lengthy journeys involving suspended animation might actually occur. Clarke's descriptions of the specific

maneuvers needed for such exploration are surprisingly accurate. Clarke even accurately envisioned the zero-gravity toilet. The movie itself has been influential for many of today's top thinkers and inventors. Bill Gates has suggested that the movie helped to form his vision of the computer. It has been said that sections of the film were shown to NASA astronauts in training.

With the help of Arthur C. Clarke, public interest in space exploration was stronger than ever before by the 1960s. People were curious, interested, and very much on board.

In the scientific community, however, Clarke is most well known for the invention of the communications satellite. Clarke served as a radar instructor and technician in the Royal Air Force from 1941 to 1946. He was the chairman of the British Interplanetary Society from 1947 to 1950 and took up the position again in 1953. Clarke won numerous awards for his scientific work including the Franklin Institute Stuart Ballantine Gold Medal in 1963, the UNESCO-Kalinga Prize for the Popularization of Science in 1961, and a nomination for the Nobel Prize in 1994. In the fifties and sixties Arthur C. Clarke was a remarkable ambassador for space exploration. His training in engineering allowed him to envision what space exploration might actually look like with astounding clarity and accuracy. His background in radar led him to be the first to propose using artificial satellites for global telecommunications, global television, and meteorology.<sup>viii</sup>

On April 6, 1965, Intelstat I Early Bird, the first commercial geostationary communication satellite, was launched into orbit. This was twenty years after Clarke had first proposed the idea in *Wireless World* magazine. When Clarke's prediction was published in 1945, hardly anyone took it seriously. The article in *Wireless World* articulated the basics behind the launching of artificial satellites in geostationary orbits in order to relay radio signals. Many people thus refer to Arthur C. Clarke as the inventor of the communications satellite.

Perhaps to the disbelief of those skeptical readers of Clarke's proposition over sixty years ago, today satellite technology is extremely widespread. At a distance of 36,000 km above the equator, there is an orbit where hundreds of satellites are revolving around the Earth at the same rate that our planet spins. Many refer to this orbit as the Clarke Orbit or the Clarke Belt. To someone watching from Earth, a satellite in geostationary orbit appears to be standing still, but really it is revolving all the way around the planet, once each day. These satellites are relatively inexpensive and extremely useful for myriad communications applications.

Let us turn to another important link in this chain of human minds: President John F. Kennedy. On May 25, 1961, President Kennedy gave his famous "Special Message to Congress on Urgent National Needs," otherwise known as the "Man on the Moon" address. In this speech, Kennedy asked the U.S. for "531 million dollars in fiscal '62" and "an estimated seven to nine billion dollars additional over the next five years" to make the dream of landing a man on the moon come true. Some felt this dream was impossible. Others assumed that this move was simply a sly Cold War strategy.

The speech followed on the heels of the Bay of Pigs incident, a humiliating event to Kennedy and his administration. As well, the Soviet Union had already made the first strides towards space exploration when they launched the Sputnik satellite into orbit in 1957 and, four years later, Soviet cosmonaut Yuri Gagarin became the first human in space. Three weeks before President Kennedy gave this speech, Alan B. Shepard became the first American in space. Kennedy was feeling an urgency like none other to send a man to the moon.

In Kennedy's own words:

"...if we are to win the battle that is now going on around the world between freedom and tyranny, the dramatic achievements in space which occurred in recent weeks should have made clear to us all, as did the Sputnik in 1957, the impact of this adventure on the minds of men everywhere, who are attempting to make a determination of which road they should take..."

"I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to Earth."

- "No single space project in this period will be more impressive to mankind, or more important for the long-range exploration of space; and none will be so difficult or expensive to accomplish."
- "...in a very real sense, it will not be one man going to the Moon—if we make this judgment affirmatively, it will be an entire nation. For all of us must work to put him there."
- "This decision demands a major national commitment of scientific and technical manpower, material and facilities, and the possibility of their diversion from other important activities where they are already thinly spread."
- "It is a most important decision that we must make as a nation."
- "...all of you have lived through the last four years and have seen the significance of space and the adventures in space, and no one can predict with certainty what the ultimate meaning will be of mastery of space."
- "...while we cannot guarantee that we shall one day be first, we can guarantee that any failure to make this effort will make us last. We take an additional risk by making it in full view of the world..."

Kennedy's vision, outlined in this epic speech, guided NASA's human space flight program from the onset. The Mercury, Gemini, and Apollo missions were all designed with Kennedy's goal in mind.

On July 20, 1969, NASA fulfilled the mission that Kennedy had laid before the nation. On that day, Apollo 11's lunar module Eagle landed on the moon with Neil Armstrong and Buzz Aldrin on board, and Michael Collins orbiting above. Six hours after landing, Armstrong walked on the moon's surface, speaking the famous line: "That's one small step for man, one giant leap for mankind." Aldrin stepped onto the moon shortly after, calling the landscape: "magnificent desolation."<sup>ix</sup> Neil and Buzz planted a United States flag and left a sign that read, "Here men from the planet Earth first set foot upon the Moon July 1969, A.D. We came in peace for all mankind."<sup>x</sup>

And lo and behold, in the nick of time for the lunar landing of Apollo 11 in July 1969, a sequence of launches was completed that put satellites in space over three ocean regions (foreseen by Clarke twenty-five years prior) which allowed television coverage of Armstrong's extraordinary moonwalk to broadcast all over the world.

Bell Labs was the name of AT&T's research lab. In the early 1900s, AT&T bought a patent that allowed a signal to be amplified regularly along a telephone line. This meant that a telephone conversation could go on across any distance assuming there were amplifiers along the line.

However, the vacuum tubes that made this possible were not very reliable, sucked too much power, and produced an excess amount of heat. In the 1930s, Mervin Kelly, the director of research at Bell Labs, realized that an improved device would be necessary for the telephone business to keep growing. He thought that the necessary improvement might be found in a type of materials called semiconductors.



A semiconductor is a group of materials whose conductivity is in between metals and insulators. (Not, for example, a metal such as copper that definitely conducts electricity, or a material such as rubber, which definitely does not). The conductivity of semiconductors can be changed by injecting charges into these materials or shining light on them.

After many years of research involving many brilliant minds (and much internal controversy), on June 30, 1948, Bell Labs unveiled the solution and a replacement for the vacuum tube. They called this invention the transistor. It indeed allowed an electrical signal to be amplified, and answered the problem of the unreliable vacuum tubes. It replaced the vacuum tubes in telephone lines and eventually became the most important component of the electronic age. At the time, however, no one paid much attention to it. It was not found to be of use in any consumer products save the hearing aid.<sup>xi</sup>

In 1952, Akio Morita of Japan purchased a license from AT&T to begin building transistors. Engineers at Bell Labs informed him that the transistors were only good for making hearing aids. However, Morita wanted to use the technology to make small radios. “But radios are far too expensive to devote to just one person,” Morita’s engineers told him. “Then we will manufacture transistor radios so they are not too expensive for just one person to use at a time,” Morita replied. “But there are not enough radio stations to support such an idea,” said the skeptics. Morita answered: “There will be.”

In the 1950s and 1960s, Masuru Ibuka and Akio Morita (who had recently founded Sony Electronics) began mass-producing small transistorized radios. All of the sudden the transistorized radio changed the world. For the first time, information could spread quickly and easily to almost every remote corner of the Earth.

Over the years, Morita’s company created a long list of new technology: the AM transistor radio (1955), the pocket-sized transistor radio (1957), the two-band transistor radio (1957), the FM transistor radio (1958), the all-transistorized television set (1959), the all-transistorized video tape recorder (1960), and the small-screen transistorized television set (1961).

People at Bell Laboratories, along with all of the electronic manufacturers in America, had decided on some level that the consumer was not ready for transistorized equipment, or perhaps that the equipment was not ready for the consumer. Sony thought outside of the box in this instance and asked themselves: “What are the unsatisfied wants of the consumer?” Sony took note that young people all over were lugging heavy phonographs and battery-powered radios with audio tubes on picnics and to the beach. Listening to the radio in the fifties was only easy to do from home. Sony identified a new growth market, satisfying the unmet needs of the consumer with portable transistor radios, and within a remarkably short period became the worldwide leader in this market.

The broadcasting stations of this era also lacked vision. Radio stations just assumed that people would need to be in their homes to listen to the radio, and thus the number of hours in the day when people would actually be listening were quite limited. The consumers didn't demand a mobile radio and no American companies identified the need. Only Sony identified the need for the mobile radio. In order to meet this goal, they began looking for the appropriate technology. Once they identified the technology, it was only a matter of time before they launched their highly popular mobile radio.

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Today we find ourselves in a very similar place within the field of mobile Internet technology. The technology exists to provide widely accessible mobile Internet to our communities, and yet we have not put this technology to use for ourselves on a major scale. Let us be inspired by these visionaries of the past, and by these remarkable accomplishments that I've just written about. In this book I hope to create a collective vision for a mobile Internet technology that will allow all of us to connect to the Internet easily and quickly from just about anywhere—a remarkable accomplishment of the future.

## Chapter 2

### Overview of the Web-on-the-Go

*“A new generation of innovation is about to change the way technology interacts with people ... In the next few years we are going to take a leap into uncharted territory<sup>xii</sup>.”* Steve Balmer, Microsoft CEO (February 17, 2009)

In this chapter I will expound upon the necessary components involved in creating an Internet infrastructure that can be accessed from just about anywhere. In this book, I will refer to this system as Web-on-the-go. Our society indeed already possesses all the technology required in order to implement this Web-on-the-go infrastructure. I will explain all of these contributing elements to the best of our current knowledge in the following pages.

Currently, we have a wide range of options for connecting to the Internet from our homes. In order to access the World Wide Web from home we need only two things: a computer, and some sort of Internet service, both of which are easily accessible, given that one is able to afford them. Available computer systems include IBM, PC, Macintosh, Dell, desktop, laptop, etc. There are a variety of options for software platforms as well, including Windows, Mac, and Linux.

Similarly, we also have quite a few options when choosing a home-based Internet service. We can purchase DSL through the phone lines from AT&T, or from cable providers such as Comcast, or even via satellite providers. From home, all of the choices are ours, and we have plenty of options.

It is important to note that in this Web-on-the-go model, we, as individuals, in some ways, do not have as much choice, nor do we get to decide everything. Access to the Web could become much more universal, and not saddled with so many personal decisions. Because this technology is applied to entire cities or counties, there are a wide array of other people who must be involved in helping to make this vision a reality, such as city council members and city executives.

So what systems and technology are necessary for our communities, in order to access the Internet from anywhere, to connect to the Web, on-the-go? Again, we need two things: a computer, but smaller this time, very mobile, and hand-held. And, we need an Internet service, wireless, strong, and available everywhere. So you can see, it is not necessarily that the players in the game change, but that we implement drastic and far-reaching innovations, and in the process change the entire playing field. In my mind, I see that there are four major components to this project. I will delve into each of these four components in the following pages:<sup>xiii</sup>

- Mobile device component
- Software platform and applications component
- Wireless infrastructure component
- People component

Mobile Internet Devices (MIDs) are a relatively new advancement in Internet technology. These devices are small and mobile, and allow a user to communicate with others, view movies, and access information from the Internet. Electronics companies are employing new Intel CPU technology (more on this later) to create pocket-sized products that allow people to easily access the Web-on-the-go. These Mobile Internet Devices have long battery life, and continue to get smaller, more stylish, and lighter as we move into the future.

These devices allow the user to surf the full Internet, keep in touch on instant messenger (IM) or voice over IP (VOIP), watch high-definition (HD) video and audio, connect with built-in wireless-around town and around the world, experience broadband on-the-go for wireless access beyond hot spots with select WiMAX-ready MIDs, and get detailed directions and personalized information based on a specific location. The possibilities for this technology are endless, and these devices are a pivotal component to a complete Web-on-the-go Internet system.<sup>xiv</sup>

As with any new technology, Mobile Internet Devices provide many opportunities for new growth. For example, Moblin, an open source Linux project, allows users to share software technologies, projects, code, and applications specific to MIDs.

In the past few years, mobile device technology has accelerated rapidly. Not long ago, cell phones had only two components: a mouthpiece and a speaker. Today, however, mobile devices have evolved into powerful handheld computers that contain cameras, GPS, WiFi, Bluetooth, keyboards, and even elegant screens with touchpad features. Microsoft's CEO Steve Ballmer has predicted that in a short time these devices will be so lightweight and thin that they can be rolled up and slipped into a purse or briefcase.<sup>xv</sup> Examples of this new mobile technology (sorry, no roll-up mobile devices yet) include Windows Mobile Device, Apple iPhone, Google Android, Blackberry, Sony Pocket PC, NetTop, and Samsung MID (mobile Internet devices). These devices are helping to change the face of Internet access.

But how can something so small be so powerful?

Inside each of these mobile devices is a little gem called a CPU or a central processing unit. A CPU is the electronic circuit in a computer that can execute the computer's programs.<sup>xvi</sup> Every computer has one. The CPU in a mobile device is just really, really small.

The Intel® Atom™ processor is the smallest processor built by Intel. It is built with the world's tiniest transistors and was created specifically for simple and affordable mobile devices, netbooks (a class of laptop computer designed for wireless communication and access to the Internet<sup>xvii</sup>), and nettops (a type of mini desktop or small-form factor computer<sup>xviii</sup>). These devices can be used for photo and video viewing, e-mail, messaging, browsing, social networking, VOIP, and many other Internet applications.<sup>xix</sup>

Another interesting component of the many mobile devices is what we call solid-state drives (SSDs). SSDs can be compared to traditional magnetic media drives (commonly known as hard disk drives or HDDs). However, SSD technology usually allows a system to perform much faster than a tradition hard disk drive. There are no moving parts in SSDs so they are at hardly any risk of mechanical failure. SSDs also consume a great deal less power than a tradition hard disk drive while simultaneously offering "improved overall system responsiveness."<sup>xx</sup> The SSD technology is "cooler and quieter"<sup>xxi</sup> than that of HDDs. This SSD technology is currently offered by Intel for use in netbooks, nettops, mobile internet devices, and digital entertainment.<sup>xxii</sup>

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Microsoft, Apple, and Google have created software platforms for these new mobile devices. This platform provides tools for software developers to build any applications that could be installed on mobile devices. Thus software developers all around the world have been building applications for the devices that are downloadable from the web. Google has provided a marketplace called Android Market for these software developers to sell their mobile device products. They even offer some of the software free.

There are three salient types of applications currently available for mobile devices: standalone applications, web applications, and complex applications such as Google Latitude. I will briefly discuss each application below.

### *Standalone Applications*

One downloads these applications onto their mobile device. Standalone applications can be run without any networking connection. A simple example of these applications are games such as chess and checkers. This type of software does not need an Internet connection to function.

### *Web Applications*

This type of software for mobile devices does need an Internet connection to function. Good examples of these applications would be using e-mail, watching YouTube, and accessing web browsers. You can launch these applications from your mobile devices when there is an Internet connection.

If you are at home, your mobile device uses your home Internet connection for these applications. At home, you may have an AT&T Internet connection with a wireless router. Your mobile devices can connect to these wireless access points and make the applications on the mobile device function. If you are at work, then your mobile devices uses your workplace network connections. If you visit Starbucks, then these mobile devices use the Starbucks wireless hotspot connections.

If you are walking on Castro Street in Mountain View, the city provides Wi-Fi access points on the street lampposts. Your mobile devices can connect to those city Wi-Fi access points and you are good to go with your web applications. If you are on public transportation, then you can use the wireless connection provided to access the web. Ultimately, a mobile device has freedom, and one can use it like a laptop computer. Right now, I cannot use my cell phone if I leave the United States. But with a mobile device, I can use it anywhere under the sky on planet Earth.

### *Complex Applications*

Recently, T-Mobile launched the Google Android Mobile Phone. This device has a Google Maps application. One can launch this application and then select *My Location*. The device has a GPS receiver that helps to identify the coordinates of one's current location. Then that information is passed over to the Google Maps server. Immediately, the map is displayed on the mobile device. This is an example of a complex application. The mobile device uses GPS to locate the co-ordinates and access the Web for map details.

Android has another advanced application called Latitude. Anyone can sign up with friends and family. Assume that the children in a family have these mobile devices. This Latitude application periodically (say every 30 minutes) sends the location information of the device to the Google server. The mother can access the Web and figure out the current location of her kids, whether they are still in school, or

walking back home or on the playground. It has a privacy control option as well.

Right now, with applications like Chat, we know exactly who is available online. Now, with Latitude, you can see the current locations of your friends. One can envision a conversation such as: George: “Hi, Jerry, are you in San Francisco? I am in Oakland. Can we have lunch together in the city?” Jerry can wait in the restaurant in San Francisco and watch George coming closer to the restaurant while he offers precise directions to the location.

This application also comes in handy in a situation I’m sure we are all familiar with: finding our lost car in a big parking lot or city. For example, let’s say you go a concert at the Shoreline Amphitheater. You parked your car in the open parking lot. There are no identification marks in the lot. When the concert is over, you need to reach your car but you can’t locate it. Assume that your car also has a mobile device installed. This Latitude application can capture your car’s location. On your mobile device, you can see the car’s location and then walk towards it.

To make this happen, car manufacturers, software developers, and business owners need to know about this particular unsatisfied need of the customer. Car manufacturers need to know about the power and features of these mobile devices. Software developers need to know about specific applications such as Google Latitude and capturing the location of the car while taking the customer closer to his car. Finally, the Shoreline Amphitheater authorities need to be in the know so that they can provide the Wi-Fi infrastructure in those parking lots.

One can also use these mobile devices to communicate with equipment at the gas station. Instead of sliding a credit card, one can pass information to the credit card equipment through a simple wireless communication such as Bluetooth. We will see the effectiveness of this system with much more detail in the coming chapters.

Wireless technology is by no means a brand-new phenomenon. To exemplify how long wireless has been playing a pivotal role in our lives, let’s take a look at a device that no home has gone without for over half a century: the radio. From its inception, the radio was using wireless as its sole medium for transmission. From its first moment, the radio broadcasting industry was always “on the air.” A few decades ago our grandparents were listening to radios that had a big vacuum tube receiver and a big antenna. Because radio broadcasting was completely wireless, and available pretty much everywhere, even on the road, it was incredibly easy for Sony to launch their pocket transistor radio that I spoke of earlier. All they needed to invent was the small device that would receive the broadcast. In other words, they did not have to worry about creating an infrastructure to support their invention. It already existed!

Television broadcasting began in the same way, completely wireless. All one needed to watch TV was a television and an antenna. However, at some point, private cable television was introduced for interested subscribers, which added a “wire” to the equation.

Perhaps the telephone could have followed a similar pattern, using wireless media instead of conventional bell wires from the beginning. Following this train of thought, had there been no wires for communicating via telephone, then we never would have used phone lines to connect to the Internet (as many of us still do with dial-up and DSL). And the same goes for cable television. Had there never been any private cable television broadcasting, the web would not have been transmitted via Comcast cable. If this had been true, then the Internet and the Web would have started as wireless media and would have been much easier to access all along. Right from the onset, we might have had an antenna at home to receive an Internet connection. At this point in history, we are realizing the benefits of

wireless Internet, and now we are exploring ways of converting the old infrastructure from wired to wireless.

Right now, we use extensive wires, cables, and connectors in order to access the web. Those wires have copper or aluminum metal inside and coated with plastics. There are huge factories manufacturing these wires, big trucks transporting the wires and cables. Laying them over the pole or underground is always disruptive and challenging. Wireless is a green solution.

In the following pages I will discuss the key elements involved in a Web-on-the-go wireless infrastructure. I want to point out some current limitations that exist within this system. I've found often we don't even question these limitations; the system is all we've ever known. Let's take a look at where we've been, where we are now, and where the vision lies for the future.

### *Cellular Phone Network*

In 1947, Bell Labs engineers at AT&T invented cells for mobile phone base stations, and Bell Labs continued to develop this technology during the 1960s. In 1945 the zero generation (0G) of mobile phones was introduced. These phones were not officially known as mobile phones because they didn't allow a user to move from one cell (coverage area) to another without interruption. It wasn't until 1984, when Bell Labs invented what is called a "call handoff" feature, that mobile phone users could travel in between different cells in the course of one conversation. Motorola is widely recognized as the first company to introduce a practical mobile phone that could be used outside of a vehicle setting. Motorola manager Martin Cooper dialed the first call on a handheld mobile phone on the third of April in 1973. Since then, due to low costs of establishment and quick deployment, mobile phone networks have spread like wildfire around the globe.

The first such commercial cellular network was built in Japan in 1979 by NTT. In the early 1980s, fully automatic cellular networks were introduced, commonly referred to as 1G (first generation). This led to a boom in cell phone use, especially in Northern Europe. This was followed by the digital 2G (second generation), launched by Radiolinja (currently part of Elisa Group) in 1991 in Finland. Today, both mobile devices and the infrastructure to support them are experiencing an explosion in growth all over the world.

However, the current cellular network is an aging technology, especially when compared to the web and the Internet. Most people don't realize this, and in recent years some have been trying to push the concept of accessing the web via the cell phone. Much time and resources have been wasted trying to make the web work on the existing cellular network. Companies are attempting to push powerful web programs like Google Maps on these very small mobile devices using the antiquated cellular network. This has been a very expensive undertaking, and most of the time, the outcome has not been desirable.

The current technology is referred to as 3G or 4G, and it is outdated.<sup>xxiii</sup> The cellular companies came up with this system. It is very expensive to install and maintain, and it is undoubtedly an antiquated manner of thinking about cellular infrastructure. With a system already in place for cellular voice communication, companies are attempting to use this same technology in order to provide Web access through the cellular network.

Once again, if we play the “what if” game and imagine that the current cell phone network had never been created, then as early as the year 2000, people would have begun to explore Wi-Fi and other wireless technology for mobile web.

Cell phones have indeed become an irreversible part of our daily lives. And yet cellular service as it exists today is not only outdated, but comes tethered to many restrictions. What if many of these restrictions ceased to exist? Think about it. As the system is now: one must purchase the device (cell phone) only from the actual service providers. One must sign a two-year contract. One must check the time of day, and the day (weekday vs. weekend) before feeling free to make (or receive) a call. Most plans offer a limited number of minutes. There are drastic penalties if ever a subscriber exceeds their allotted minutes or breaks the two-year contract. There are extra fees for sending and receiving text messages or accessing the web. This system offers the consumer no freedom.

A story that illustrates the limitations of the current cell phone network involved a man named Wayne Burdick, on a cruise ship in the Miami Harbor. While the ship was still docked in Miami, Burdick set up his laptop and wireless card and accessed his Slingbox device. This enabled him to watch a Chicago Bears game via the Internet. He was watching the game for about three hours. Burdick returned home to find a bill from AT&T charging him over \$27,000 for the three hours of Internet usage.<sup>xxiv</sup>

Stories such as this, though funny, feel all too close to home. Who hasn't paid an exorbitant cell phone bill? I would propose that this sort of limitation on our cell phone usage is not necessary. However, in order to get there, we must evolve towards an up-to-date wireless infrastructure. The solution lies in new technology and new paradigms of thought, both of which I will continue to expand upon throughout this book.

### *Wireless Hotspot/Municipal Wi-Fi*

One example of newer wireless technology is a Hot-spot. Also known as Hot spot or HotSpot, this term refers to a business or other venue that offers Internet access over a wireless local area network (LAN). Wi-Fi hotspots were first proposed by Brett Stewart in San Francisco in 1993. He didn't use the term 'hotspot' at that time, but called his idea “publicly accessible wireless LANs.” The original idea for a wireless Hot-spot was that users would pay for broadband access at these specific locations. These days, just as often, a wireless Hot-spot is a free service. Hot-spots continue to grow around the nation and the world. Using the same technology, wireless networks that range entire cities, often referred to as Municipal Wi-Fi, have been gaining popularity. MuniWireless reports that over three hundred metropolitan wireless projects have been started.<sup>xxv</sup>

### *Wireless on Public Transportation*

Accessing the Internet on public transportation is already happening in many places around the globe. In Japan, citizens can log in on many public trains and buses. In the U.S., there are at least twenty different cities offering wireless Internet on public transport, including Colorado Springs and Cincinnati.<sup>xxvi</sup> Buses running from Heathrow Airport in England are also offering free wireless Internet. “Given the passenger demographic, airport bus and coach routes are a natural choice for Wi-Fi services,” said Dave Palmer, senior vice president of worldwide sales at Icomera (a company specializing in mobile internet technology). “Business passengers can get online at no cost and make the best use of their time. More importantly free Wi-Fi is the preferred way to connect while traveling abroad as it avoids high international 3G data roaming charges.”<sup>xxvii</sup>



## *WiMax*

Another wireless option is called WiMax. WiMax is a broadband wireless system that is widely supported by both the computer and telecom industries around the world, which has helped to make this technology particularly cost-effective. It has been created in order to offer significant business benefits to operators and users in a wide array of environments (enterprise, consumer, emerging, public service), geographies, and demographics (urban, suburban, rural), both over the short- and long-terms. Throughout the remainder of this book, I will illustrate numerous examples showing why WiMax is the most beneficial infrastructure available in order to create a widespread, Web-on-the-go model of easily accessible Internet from anywhere.<sup>xxviii</sup>

## *Wireless over Unlicensed Spectrum*

And now throw this into the mix: There is a phenomenon called ‘white spaces.’ These are slivers of wireless spectrum between the broadcast channels used by television stations. Originally, these slivers were created in order to avoid interference between television broadcasts. This year, however, on February 17, 2009, television stations moved on to new frequencies following an order by the government to switch everything over to digital broadcasting. In this change, many are glimpsing an opportunity.

A few companies, including Google and Microsoft, have been in conversation with the Federal Communications Commission with the hopes of offering up this spectrum to the public for free, unlicensed use. Other companies are also in favor of freeing up these airwaves, including Dell Inc, Intel Corp, Hewlett-Packard Co., and the North American unit of Phillips Electronics. Google has been clear about the benefits such use of the white space would have upon their own company. Wherever the public is gaining access to the Internet, an ad-based company such as Google stands to benefit. Silicon Valley has said they would also benefit from such a system, and no doubt the other companies on board see it as a lucrative endeavor for themselves as well.

There are already similar slices of airwaves being used by home, business, and city Wi-Fi networks.<sup>xxix</sup> An executive from Google has referred to this plan as providing something similar to “Wi-Fi on steroids.”<sup>xxx</sup> Google has said publicly that the airways could provide “huge economic and social gains if used more efficiently.”<sup>xxxi</sup> Google believes that mobile devices using this white-space spectrum should be available by the end of 2009.

Google sees this white-space spectrum as a fantastic air space in which to operate a brand new type of cell phone and wireless device based on Android, a software model that many other companies are now planning to replicate. Using the proper mobile device and the white space, it is thought that users will be able to watch movies and do other things while on the go that are now difficult on slower networks.

This idea is still opposed by broadcasters and manufacturers of wireless microphones. These people still fear that the mobile devices using the white space would cause interference. The FCC is currently conducting tests to gain a better understanding of whether this white space spectrum can be used without disrupting television broadcasts.

Google has offered a few solutions to the argument that the use of the white space would cause interference. They proposed keeping a few channels for the exclusive use of wireless microphones,

along with medical telemetry and radio astronomy devices. They also offered that ‘spectrum-sensing technology,’ already being used by the U.S. military, can sense whether a channel is being used before accessing it, which would avoid interference between channels. Google has also offered to help other companies take advantage of the white-space airwaves.

The FCC is currently studying a proposal that would create two categories of user groups for these airwaves: one for personal portable devices that are low-powered, and another for commercial operations.

### *Satellite Wireless*

The VSAT (very small aperture terminal) was invented by Hughes in 1985. Soon after, the company introduced to the market the satellite networks industry, with Wal-Mart signing up as their first customer. The company is a world leader in mobile satellite system design and development. Over the years, the company has continued to expand and currently Hughes ships satellite terminals to a variety of customers in over one hundred countries. Hughes technology is available in North America directly from Hughes. In other countries, their satellite networks are available from various resellers. The company’s broadband satellite networks and terminals are based on the IPoS (IP over satellite) global standard, approved by the TIA, ETSI, and ITU standards organizations.<sup>xxxii</sup>

### *Ad-hoc Network*

Ad-hoc technology was originally developed in the military. It became necessary to create a system for troops to communicate in regions where there is no cell phone infrastructure. Imagine, for example, that hundreds of U.S. troops are moving in different locations around the deserts of Iraq. It is imperative that they be able to communicate among themselves to effectively implement strategies and plans. Their location is both foreign and remote, and lacks any Internet infrastructure. In order to resolve this problem, the military created what is called the ad-hoc network.

This technology is very simple. Each unit, or military division, has a wireless device. Each device is able to make a wireless connection with neighboring devices, and thus a network is rapidly established.

I think that this ad-hoc network technology will prove extremely useful in domestic situations. For example, let’s assume there is a conference underway for software developers. Even within the conference hall, an ad-hoc network can be established. This will allow all the participants to be connected, without relying on the Internet.

Or let’s imagine that a family takes an outing to a large store such as Costco. While the husband peruses the computer section, the kids are checking out the video game section and the wife is in the grocery section. They are all under one roof and yet if they want to communicate, they need to pick up their cell phone and connect via their cellular network. This ad-hoc network would allow the family to be connected easily. “Yes, I am done. Come meet me at the check-out line,” the wife could broadcast quickly and efficiently to her family.

As you can see, the technology exists to upgrade our aging wireless infrastructure, and to provide an easily accessible Web-on-the-go system that will undoubtedly prove to be an invaluable service to communities everywhere.

### *Vision and Social Responsibility*

It is interesting to me that Arthur C. Clarke had one vision that proved extremely useful to the general public (satellite communication) and another vision that might not necessarily be seen as “useful” in that way (man on the moon). Though arguably, putting a man on the moon has served humanity, as it filled us with wonder, optimism, and inspiration.

Visionaries should not spend all of their creative energy envisioning things that are not helpful to humankind. One ought to dream with social responsibility, if you will. However, it is not useful for us to tell these dreamers what to dream about. Once a condition is placed upon them, a protest ensues, and the dreamer might spend an entire lifetime fighting the limitation that has been placed upon them.

In the case of Arthur C. Clarke, one might try to place a higher value on one vision than on another. Perhaps one might think that the communications satellite is more worthwhile in the long-run. As I see it, both of these visions came from a common action: Arthur C. Clarke was incessantly looking upwards at the sky and dreaming of venturing into space. Perhaps his vision of a man on the moon led him to explore the possibility of satellite communications. What if Arthur C. Clarke had spent all of his time looking down at the earth? Maybe he would have dreamt instead of laying cables in the ground for distance communication.

We live in challenging times, with many changes looming in front of us. It is not the time to be thinking frivolously, or only about ourselves. In my eyes, dreaming with social responsibility is extremely important, and I would offer it as a suggestion (not a condition) to all the visionaries of our time.

### *Common Mission*

Usually, a visionary creates a document of their vision. This could be in the form of an article, a paper, or a book. In preparing this documentation, it would be most efficient if they incorporated the perspectives of policy makers, scientists, management, and the general public. The document should communicate very clear messages to each sector listed above.

The different people involved in Web-on-the-go will need to work together just as members of a football team. Everyone has his specific role and responsibility, and everyone shares a common goal. Provided that the importance of each team member is fully recognized, and the overarching objectives are clear, then everyone will be able to contribute effectively to meet the common goal. As in most areas of life, effective communication will be critical.

Oftentimes, visionaries live in a world that is isolated from the policy makers, while scientists live in a very separate reality from management executives and others. We all find ourselves in a bubble reality, paying little attention to what is happening in other sectors of society, and often criticizing another sector for not doing their job well. But for a project to be successful, each group must recognize the

importance of every other group, and learn how to communicate effectively. Then and only then will the mission be accomplished.

In the business world, mission statements act as a guiding force for all the people in the organization.

### *Web-on-the-go Mission*

The mission statement helps visionaries to dream about a particular field. For example, Mobile Web helps the policy makers, management executives, scientists, and engineers in coming up with their own unique objectives. Ideally the general public also becomes informed about the final product and services that each individual will ultimately receive from this mission. Once the objectives are clearly defined, then everyone will hopefully come up with the resources and time needed to achieve their common goal.

So the document created by the visionary must communicate clearly with the general public, the policy makers, scientists, and others. Included in the document must be details needed for each sector to move forward effectively. The politician must be shown how to make a new political decision and how the decision will be seen as a historical one. Similarly, the scientist must be told about the more intricate details of the project (such as with the zero gravity toilet). As well, the management executives must be able to clearly envision the resources needed to complete the project and how to market these products to the public. The document should not, however, go into the details of implementation. This is the job of the management executives and others.

The next few pages briefly touch on some of the key players who will need to be involved in Web-on-the-go technology.

### *Visionaries*

Visionaries don't think, they dream. They don't live in the present but instead seem to reside permanently in the future. It could be said that they don't follow logical thought patterns, and yet their imagination is always at work. Often it seems that visionaries don't care about financial, human, and other resources, nor about the feasibility and practicality of their ideas. It appears that their imagination has no boundaries or constraints. Once an idea takes shape in the imagination of a visionary, it is strongly believed to be real. Oftentimes visionaries put themselves at the center of their imagination. For a visionary, once one has documented their vision, there is a feeling of completion. There is a sense of satisfaction and achievement. It really doesn't matter whether someone takes their vision and makes it into a real object or experience.

For example, Clarke's vision was "Arthur C. Clarke is on the Moon." Once this vision was complete, then it became documented with more particulars. Since Clarke imagined himself as the subject of his vision, he captured all the experiences of space travel with astounding accuracy. An example was his zero-gravity toilet idea.

Since the visionary resides in the future, it is often difficult for others to realize, understand, and appreciate his ideas. More often than not, new ideas are scorned and categorized by the logical masses as hypothetical and far-fetched. It may take decades for other people to fully grasp the ideas of forward-thinking visionaries and to set about making these ideas manifest.

To speak broadly, quite often people are totally consumed with their own lives and problems, and do

not have space in their agenda to ponder new ideas. For example, right now we find ourselves in the midst of an economic recession. Many are spending a great deal of time analyzing the past and trying to understand what went wrong and when. Others are spending their time coming up with plans and methods for what challenges lay ahead. We are so wrapped up in the past and the problems that we face that we have a difficult time seeing more than ten or twenty years down the road.

Visionaries don't seem to be daunted by the past or present crises, nor of the challenges to come. All they see are the future opportunities. In this moment they might be struggling to pay the bills and buy groceries, and yet they are still dreaming about putting a man on the moon, for example.

First and foremost, these creative and innovative people must identify their innate gift of vision, and keep this imaginative process flowing. More often than not, visionaries don't really understand their gifts. They often beat themselves up, thinking of their dreaming tendencies as a handicap, rather than having a positive impact on the world. Indeed, our society mirrors this attitude, and perpetuates it.

And others as well must begin to recognize the importance of these visionaries in our society, and create a space for them to continue with their dreams. Business establishments need to identify these individuals and set them free, providing them with the resources necessary to continue to dream.

For instance, the most salient visions of Arthur C. Clarke were putting a man on the moon and launching a satellite for communication. It is possible to appreciate the importance of these ideas only when we think about what life might be like if these visions had never come to fruition. Had Clarke never imagined a man on the moon, Russia and America most likely would not have attempted to build rockets or send human beings to space. NASA probably would not exist, nor any of its world-shaking achievements. Visions such as these have been the most important motivating factor for countless innovations and breakthroughs in our human history.

### *Policy Makers*

Policy makers are politicians. The main objective of a politician is to secure a favorable place in history. Kennedy, of course, will always be remembered as the president who sent a man to the moon. Policy makers need innovative ideas that will have a huge impact on society. Policy makers are (or should be) always on the look-out for the visionaries of their day. Politicians have resources, both financial and human. When they choose the right vision, and effectively implement it with the resources available to them, then they will secure their place in history.

Kennedy chose the man on the moon vision. Politically, Russia's prior achievements in space exploration led the president to make the decision to land a man on the moon. He made the best use of the resources available to him at that time. And, when Armstrong indeed set foot on the lunar surface, every single citizen felt a deep sense of achievement and pride.

In the face of our current economic recession, President Obama has chosen to put focus towards a vision of broadband for all. Using resources from the stimulus package, Obama hopes to make this vision a reality. Once this dream is realized, it will have a tremendous impact on the lives of Americans, and people all over the world.

In the United States, the president makes policy decisions at a very high level. In the stimulus package *broadband for all* means *for all*, in every city and town. However, it is up to city councils and city government executives to decide how to implement such a policy. It is imperative, then, that these

more local policy makers have substantial vision and knowledge about the mobile Web topic in order to understand all applicable opportunities, risks, and challenges.

Let's take the case of municipal Wi-Fi for the city of San Francisco. This idea was proposed initially by executives of Google and Earthlink. City executives asked for clarification from these firms on certain topics, and when Google and Earthlink failed to respond, the project was dropped. In this case, executives from the technical firms did not respond to the city executives' queries, and thus the entire project was lost. I think that those technical firms must realize that they missed out on a fantastic opportunity. Had they communicated their ideas more clearly and diligently, I think it's safe to say that mobile web would be up and running right now in San Francisco.

Without the support of the policy makers, the mobile web cannot be implemented. Let's not ignore them! Let's work to answer all of their questions and be sure to clarify for them all of the opportunities, challenges, and risks involved in this project. Let's treat them as partners.

### *Scientists and Engineers*

The Bell Labs story might offer an important lesson to current scientists and engineers. Oftentimes, engineers and scientists isolate themselves from the world and focus very deeply on their own inventions. They get so caught up in what they are working on that they sometimes can't see the bigger picture: mainly how will their invention serve society, and what some of the practical applications are.

The engineers at Bell Labs were not very receptive to the ideas of Sony's Akio Morita. They thought his idea was not practical. Had they given him the benefit of the doubt, however, and worked together with him to achieve a common vision, perhaps the end result would have been even more valuable, more lucrative, and more helpful to society than the transistor radio.

If the management executives challenge scientists and engineers to come up with a new product, then those scientists will work diligently with total involvement to invent that new product or solution. Once a product is invented, however, and a prototype is made, many scientists think that their job is over. Often they are not so concerned with how the product is manufactured, marketed, or used. Or they are somewhat removed from the problem or challenge that the product they are creating is attempting to solve. Because of this, it is tricky for scientists and engineers to fully grock both the satisfied and unsatisfied wants of the consumer. Ideally, scientists and engineers would value the importance of the other key players in the marketplace, and work to communicate with these players throughout the process. Once this basic understanding is established and communication is made effective, then it will be much easier to make a vision into a reality. It will be a win-win for all members of the team.

Let's return to an earlier example: Google Latitude. Scientists know how to capture the GPS location data; they know how to update the current location information; they know how to provide the viewers the current location of their friends and family members. But it was not a scientist who came up with the idea to build a Google Latitude application. Scientists did indeed play a key role in the development of this software, but it was someone else who clearly defined the requirements. Once they got the idea,

the scientists and engineers used their vast expertise to build that application. It is essential for each member of the team to understand the general quality of other team members. Then they can effectively communicate.

### *Device Manufacturers*

Intel has realized the potential for the Mobile Web and they are actively promoting processors for the Mobile Internet Devices. Many manufacturers like Sony, Samsung, HP, HTC, and others are already making Mobile Internet Devices, Pocket PCs, and other devices. The market will soon be flooded.

Now, many people have a desktop as well as laptop. Likewise, one single person may have two or three mobile devices. A person may have a Pocket PC in his shirt pocket and a Mobile Internet Device in his briefcase. He may use the small device to read e-mails and look at maps, and use the slightly bigger one for writing e-mails or typing a document while sitting on the park bench.

So there will be a huge volume of these devices flooding into the global market. And all these devices have wonderful features such as a camera, GPS, and other networking connectivity.

Assume that you build a highly sophisticated sports car, but there are no roads or highways or tracks. Then what is the use of those cars? Similarly, these Mobile Internet Devices will be of no use if there are not enough service providers for wireless infrastructure.

### *Wireless Service Providers*

Private establishments such as Starbucks, McDonalds, bookshops, and so many others have provided wireless access to their customers. Public transportation also offers wireless access. But the city council and city government executives need to make a major decision about providing wireless access all over their city. First, they need to understand the importance and necessity of providing these services to the people. Second, they need to be aware of the various technology and various technical solutions available to them in order to make the right decision. Again, effective communication is essential among all these team members in order to make the Web-on-the-go mission a reality.

### *Software Developers*

Software developers can build pretty much any application. But we can't assume that these developers will identify all of the potential applications and then deliver this to the public. I have seen software developers come up with newer and better versions of old software (such as chat and e-mail) but it might take a new vision to get these software developers to switch gears.

### *Management Executives*

The work of the scientists quite often is contained within the lab. It requires management executives to take products out of the lab and deliver them to the public as a new product or service. It is absolutely pivotal that scientists understand the importance of management tasks and vice versa. With mutual respect, these different players can grow together. Again, Bell Labs and Sony are exemplars.

### *Other Business Establishments*

When the Web was launched, it was mostly used for e-mail communication. Only later did the business establishments start paying attention to it and begin to use the new Web technology efficiently for their business. The banking industry came up with online banking solutions; the retail industry came up with online shopping; fast food chain restaurants came up with many online features. It is essential for those in industry to take a look at the most current technology and figure out the best possible way to make the use of it to serve their clientèle.

Right now, most of the Mobile Internet Devices are being used to read and send e-mail on the go. Very soon, the banking industry and retail and other business establishments will take a look at the facility available with those Mobile Internet Devices. They may come up with some surprising and innovative applications.

### *General Public*

What the public has is purchasing power. If an effective product and solution is offered, most likely the public will recognize its value, and choose to spend their money on that product.

### *Blind Men's Perspective*

You have seen now how many different components truly are involved in this mammoth industry. Each company has a different expertise: Intel has an expert perspective on the chip and SSD. Samsung and HTC have a very informed perspective on manufacturing these Mobile Internet Devices. Google, Microsoft and Apple have the best software and applications info around. Similarly WiFi service providers could tell you all about the infrastructure of such a system.

Here is the blind men and elephant story: Six blind men were asked to determine what an elephant looked like by feeling different parts of the elephant's body. The blind man who feels a leg says the elephant is like a pillar; the one who feels the tail says the elephant is like a rope; the one who feels the trunk says the elephant is like a tree branch; the one who feels the ear says the elephant is like a hand fan; the one who feels the belly says the elephant is like a wall; and the one who feels the tusk says the elephant is like a solid pipe.



A wise man explains to them: "All of you are right. The reason every one of you is telling it differently is because each one of you touched the different part of the elephant. So, actually the elephant has all the features you mentioned."

This resolves the conflict, and is used to illustrate the principle of living in harmony with people who have different belief systems, and that truth can be stated in different ways. This is known as the theory of Manifold Predictions.

My intent in this book is to eliminate the "blind man's perspective," to bridge the gap between all of these different people and focus on the whole. I want to show how all of these groups are holding unique positions in a very large and connected playing field. This book helps all to have the whole perspective; it bridges the gap between the technology and the customer on-the-Go.

The following pages illustrate the potential real-world applications of Web-on-the-go through a series of stories. Each story describes a specific life situation in which the characters lack the Web-on-the-go technology. I will then introduce the Web-on-the-go technology and retell key parts of the story, exemplifying the ways in which this system would alter, simplify, and benefit the lives of ordinary citizens. Please be aware that the Web-on-the-go scenarios are hypothetical, and some of the applications do not yet exist. However, I include only applications that could easily be created given currently available technical expertise, models, and materials. Indeed my hope, and an overarching goal of this book, is to introduce these ideas to the proper audience, who will then be inspired to make them manifest.

## Chapter 3

### Trip to the San Francisco Zoo

As the plane touched down in San Francisco, Julia could not contain her excitement. Descending over the Bay Area was exhilarating and Julia was astounded at the beauty of the hills, the Pacific Ocean, and the skyline of the city. It was her first trip to San Francisco, and she was here on vacation, visiting Jerry, whom she'd met over five years ago when he was an exchange student at her university in London. Jerry and Julia hadn't seen each other for over a year.

Julia was very excited to reach San Francisco and immediately she felt the urge to share her excitement with her family back home in London. She had promised her parents that she would be in touch when she reached the United States. She also wanted to let Jerry know that she had arrived safely and on time. She had her cell phone but it worked only in the UK, not here in the U.S. She couldn't contact Jerry or her family, nor could they be in contact with her. Indeed, all of a sudden she realized it was silly to have brought it at all.

Once inside the airport and through customs, Julia located a payphone. Fortunately she had exchanged some Euros into dollars back in London, but she had to go into a restaurant to exchange a dollar into quarters. Finally, she called Jerry, who was just pulling up outside the baggage claim. Elated to see each other, they told stories over dinner and drinks at a Mexican restaurant in Palo Alto, where Jerry lived.

Unfortunately, Jerry had to work the day following Julia's arrival. He was fairly new at his job with a technology firm in Palo Alto and hadn't been able to get the day off. Over dinner, Julia decided that she would go by herself to the San Francisco Zoo the following day. Julia decided right away that she would take public transportation. She didn't want to take Jerry's car, or rent a car, as she was nervous about driving on the other side of the road, especially in the middle of the city. Jerry didn't have a clue how to give her advice on public transit, as he always drove his car, though he knew it was possible to get to the zoo by taking buses and trains. After dinner and back at Jerry's apartment, they looked up the San Francisco Zoo from Jerry's computer in order to plan Julia's trip.

They were happy to discover that the SF Zoo website encouraged people to take public transportation, and even offered a discount to those customers who brought their receipt. Jerry and Julia logged on to the 511.org website to get help on what public transportation was available. They entered the address of Jerry's apartment as the starting point, and the address of the zoo as the end point. The website offered them a detailed itinerary, telling Julia exactly what to do from her doorstep to the zoo. They printed this out and Julia felt confident that she'd be able to do it by herself.

In the morning, Jerry rushed to the office early for a meeting. Julia made herself an omelet and phoned her parents from Jerry's landline. She checked her e-mail on his computer. She packed a bag with a water bottle and some fruit, and then set off to find the zoo. All the buses and trains were on schedule, and she arrived there without a problem.

Julia was thrilled to be in the city. She thought about a friend in London whom she would have loved to talk to right now, but she couldn't figure out how, other than to use a payphone, and she knew that would be ridiculously expensive. Jerry had asked her to call and let him know that she had arrived safely. After a bit of searching she found a payphone and called Jerry. He didn't pick up as he was having coffee with his boss, but she left him a message letting him know that everything had gone well.

Julia bought the entrance ticket and got a map for the zoo. She wanted a cup of coffee so she looked at the zoo map and found a restaurant. While having coffee, she looked over the map and planned out her trip inside the zoo.

First she saw the birds, then the monkeys. She saw the big cats and stood for a long time watching a zebra eating. Julia saw that there was a theatre at the zoo that offered daily 'wildlife theatre.' The next show would begin in fifteen minutes. Julia was looking for the theater location on her map, trying to figure out how to reach it from where she was. She was proceeding in one direction looking at the signposts along the side of the pathways. After a few minutes of walking, she realized that the other route would probably be shorter. After getting a bit lost and flustered, Julia arrived at the theater, but the show had already started.

Nonetheless, Julia had a fantastic trip to the zoo. She spent a long time watching the tigers lounging around in the shade. She took a bunch of pictures with her digital camera that she would later upload to her Picasa account so that her friends and family could check them out. She enjoyed the California sunshine and ate her lunch outside. She was still feeling very proud of herself for finding the zoo all by herself in a foreign country. Now it was 5:00 and the zoo was about to close, but it was too early to head back to Jerry's apartment. He had said that he'd probably be home around 7:30.

Julia decided to try to find the Golden Gate Bridge. It seemed like a daunting task, however, and Julia really wasn't quite sure how to get there. She had no Internet access or else she would have logged on to the 511 website and printed out an itinerary similar to last night. She looked around for a payphone. When she finally found one, she dialed Jerry's number again. Luckily, he answered. She asked if he could look up directions from the 511 website from the zoo to the Golden Gate Bridge. Jerry was having a very busy day at work, and he really didn't have the time at that moment to dictate the directions to Julia over the phone. Nor did he have much faith or interest in public transportation.

"Take a cab," he said, "It will be way easier." Jerry explained how to do it. "Is there a phone book there?" he asked.

"Yes," said Julia.

“Turn to the back pages and look up ‘Taxi,’” said Jerry.

The pages of the phone book were old and tattered, with many pages missing. Julia looked and found a company called Yellow Cab.

“You’ve got to call them, tell them where you are, and they’ll come pick you up,” said Jerry.

Julia hung up with Jerry and called a cab. She waited about 10 minutes, and the cab showed up in front of the zoo. The cab driver was very friendly, and chatted with Julia while driving her towards the bridge. At Julia’s request, he dropped her off at the north end of the bridge, and then charged her what seemed like an arm and a leg for the ride.

Julia was very excited to see the bridge in person, after seeing it in photographs ever since childhood. It was such a magnificent feat of engineering excellence. She walked from the north end of the bridge back towards the city, stopping for a while in the middle to admire the bay, the water underneath the bridge, the sailboats, and the view of San Francisco. It was sunny and windy and there were a lot of other tourists and bikers enjoying the view. She took tons of pictures. Then, after some time, again she found herself looking for a payphone. She discovered one near the rest room on the south side of the bridge. She called Jerry.

“Here I am at the bridge!” she said, excited. “It’s so beautiful!”

“Nice,” said Jerry. “I wish I were there. I get off work in a few minutes. Have you figured out how to get home from there?”

“Well, I’ve got my itinerary,” answered Julia.

“Yeah, but that was from the zoo. Now you’re at the bridge. Do you know how to get back?”

“Oh, shoot,” said Julia. “I didn’t even think about that! Oh, man, this might get complicated. I guess I’ll have to call the cab again, and have them take me to the train.”

“How ‘bout this,” said Jerry. “I’ll come pick you up and we can drive into Sausalito for dinner. It’s right on the other side of the bridge, and there are some fantastic places to eat there.”

Julia was thrilled.

“So, it might be an hour before I get there. Wait close to the restrooms and the payphones at 7:30. I should be there by then.”

Julia was very happy to spend another hour in that beautiful spot, and quite relieved that she didn't have to worry about taking public transportation back to Jerry's house. Julia returned to the restrooms at 7:30 and waited. Fifteen minutes went by but there was no sign of Jerry. Julia had no way of knowing, but he was stuck in traffic. Finally he showed up around 8:00. They were both starving. After a bit of searching, they found a sushi restaurant in Sausalito and then took a stroll along the beach. Afterwards, they drove back home.

It is a few years in the future. In a very short time, Web-on-the-go has become a universal phenomenon. Pretty much every global citizen has at least one Mobile Internet Device. Wireless access is available just about everywhere under the sky on planet Earth. Julia brought her Samsung MID to America with her, and also her Sony Pocket PC. She uses the MID to read e-mails and to do some quick work online. She uses the Pocket PC to write e-mails, read e-books, and more. The MID fits into her shirt pocket while the Pocket PC stays in her handbag.

When Julia arrived in San Francisco, she pulled out her MID and sent a quick text message to Jerry, who immediately responded, letting her know he'd be waiting out front in his car, and then another to her parents back in the UK to let them know she'd arrived safely.

Later on that night, Julia and Jerry were looking at the San Francisco web site and then the 511.org site to get clear on Julia's public transportation route to the zoo. On the 511.org site, a link was provided to download a transit trip planner application to one's Mobile Internet Device. Julia downloaded and installed that application in her MID.

The next morning, Jerry rushed to his office for the staff meeting. Julia got up and began preparing her breakfast. At work, in the meeting, all members of the firm were offering updates on their current projects. Jerry gave his update early and then listened to the updates from members of a team in different departments. Jerry had his laptop in front of him. He launched the Google Latitude application. It showed that Julia was still in Palo Alto. He sent a short text message, “Hi, are you still at home?” Julia responded that she was eating her breakfast. Jerry texted back: “Have a great trip to the zoo!”

Around 9 A.M., Julia left the apartment and launched the 511 transit trip planner application on her Mobile Internet Device. The MID picked up her location from GPS and responded with a map showing her a map of the neighborhood she was standing in, including names of surrounding streets. The trip planner application prompted her to say or enter the place where she wanted to go. Julia said, “San Francisco Zoo.” But the application couldn't recognize her British accent. So she had to enter the destination using the keyboard. Then the application asked her the next question, “When do you want to go? She entered “now.” Then the application came up with an itinerary, based on her current

location, the current time, and current traffic conditions. This is known as “Information in Real Time.”

Now Julia’s MID showed her a map with the directions that she needed to follow. It also had voice instructions. “Walk to that corner.” She walked to the corner. The device picked up the GPS location and also did some internal calculations to arrive at Julia’s new location. Then it said, “ Turn right and walk to that bus stop.” Julia now reached the bus stop. The MID said, “It will take another five minutes for the bus to arrive. Have a dollar and 25 cents for the bus fare. It will be a ten-minute bus journey to reach the Caltrain station.” After about five minutes, the bus arrived. Julia paid the fare and within a few minutes she reached the station.

Julia was very excited about her first bus and train trip in California. She was proud of herself for doing it all alone. In fact, she didn’t really feel that she was alone. The voice instructions from the MID 511 transit planner application made her feel safe, and strangely enough, as if she had company.

Meanwhile, Jerry was still in his weekly staff meeting, listening to people give their updates, while off and on checking the Google Latitude application on his laptop. He could see that Julia had reached the Caltrain station. In some cases, for obvious reasons, one would want to turn on the Google Latitude application’s privacy feature, in order to block anyone (or specific people) from being able to see their location. In this case, however, Jerry and Julia were not at all concerned with privacy. Jerry really just wanted to know that Julia was doing okay. Soon, the meeting was over and Jerry rushed to his cube. He called Julia to talk to her about her trip so far. Meanwhile, Julia’s Mobile Internet Device told her that the train for San Francisco would be arriving at the platform shortly, and was giving her all the relevant instructions.

“I can’t believe how easy this is!” Julia said to Jerry. That eased Jerry’s mind, and he got back to work, not so worried that Julia might run into trouble finding the zoo.

Julia boarded the train and began traveling north towards San Francisco. Meanwhile, her Mobile Internet Device continued to pick up her current location from GPS and informed Julia about each approaching station. When the train approached Millbrae, her MID let her know that she needed to get off at that stop. Thus Julia followed the step-by-step voice instructions and reached the San Francisco Zoo safely. Since Jerry and Julia were both online, every so often they would exchange small messages, making jokes and enjoying each other’s virtual “company.”

Julia reached the zoo and bought her entrance ticket. At the entrance, Jerry had let her know that there were instructions for installing the Zoo Guide application onto her Mobile Internet Device. Julia asked about that feature at the counter. The assistant told her that this application included the zoo maps, timings for shows, and specific directions to any location within the zoo, such as the theater and restaurants.

Julia noticed that on every lamppost in the zoo, there was a wireless access point.

“What’s up with the access points on the lampposts?” Julia asked the assistant. The employee told her it was the Zoo Wireless Network and that the Zoo Guide application installed on her Mobile Internet Device accesses those points. Through the same application, Julia learned that she could also access the Internet. However, she had noticed already that she had coverage throughout the city, thanks to the new municipal Wi-Fi service in San Francisco.

Julia went to the Zoo Guide Application Download booth. Bringing her MID close to the counter, a Bluetooth connection was established between her MID and the counter. She then easily downloaded the Zoo Guide to her MID. A message popped up: “Do you want to install Zoo Guide application on your Mobile Internet Device? Yes or No.” Julia selected “Yes” and after a moment another message popped up: “Zoo Guide application is successfully installed on your Mobile Internet Device.”

Julia now launched the Zoo Guide application, which immediately established a wireless connection with the nearest lamppost. Each lamppost access point had a unique identification name, and with that name, the application could access the current location of the user inside the zoo. Julia selected the option: “Locate rest room.” Her MID immediately gave directions on how to reach the nearest restroom from the location where she was standing at that moment.

Julia wanted a cup of coffee, and so asked the MID where the closest restaurant was. Immediately, it gave specific directions on how to reach the restaurant. While she was drinking her coffee, she explored the Zoo Guide application on her MID. She let Jerry know that she had downloaded the Zoo Guide application through the chat feature on her MID.

Then Julia alerted her MID that she wanted to view the tigers. The Zoo Guide application gave her step-by-step instructions on how to reach the tiger cage. It also alerted her to the other animals she’d see on the way. Her MID offered Julia rich background information about tigers in their natural habitat, and about this particular tiger and its family. Julia really felt that she was walking with a real person, a guide, who was telling her all about the animals at the zoo. She took a few pictures of the tiger with her Mobile Internet Device camera. Those pictures automatically uploaded to her Picasa account. Immediately, the tiger pictures were available in the public folder on her Picasa account. Right then, Julia noticed that her dad was also online. He was in London. She started chatting with her dad and sharing her pictures from the San Francisco Zoo.

Then Julia was looking at the wildlife show times in the Zoo Guide application. The next show would begin in 10 minutes. She wanted to go. This time the Zoo Guide application on the MID gave her step-by-step instructions about how to reach the theater from her current location and thus she arrived on time. During the show, she noticed that an elderly Chinese lady also had a Mobile Internet Device and was watching the show. But the elderly lady was listening to the show commentary from her MID. Julia was curious to know what she was listening to. When she asked, the Chinese lady said that she was listening to the Chinese translation of commentary about the show.



Once the show was over, Julia continued happily wandering about the zoo. She was confident that she would never get lost with that device on hand.

Again, in the evening, she decided to go the Golden Gate Bridge. This time she had no regrets that she hadn't planned ahead for this side trip before leaving home. When she left the zoo, Julia launched the 511 Trip planner application. The application registered her current location from the GPS sensor and said, "Right now you are in San Francisco; where would you like to go?" Julia entered "Golden Gate Bridge." The 511 Trip planner application came up with information about the public transportation that would take her to the bridge, and Julia arrived there safely in a very short time.

Almost the whole day, Jerry was watching her going from place to place on his laptop, running the Google Latitude application. Jerry sent her the message: "It looks like you are going to Golden Gate Bridge. Stay there and I will pick you up."

Julia was happily walking on the bridge. This time, even without a cell phone, she easily stayed in touch with Jerry in the U.S. and her family in UK. There was no need for her to use the pay phone or wait around near the restroom so that Jerry could find her.

Checking the Latitude application on her Mobile Internet Device, Julia noticed that Jerry had left Mountain View and was driving north on Highway 101. After an hour, Jerry parked his car and got out his Mobile Internet Device. He selected walking directions to reach Julia. The device was pointing towards the middle of the bridge. Jerry walked and noticed in his device that Julia was also walking towards him. Both of them saw a handshake sign on their devices and by that time, they bumped into each other.

They spent some time together on the bridge. Then they searched for a good restaurant close by using their Mobile Internet Devices. The result showed a few in Sausalito. They spent an incredibly enjoyable evening, and then headed back to Jerry's apartment.

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These days, pretty much everyone has a cell phone. We pay a premium fee for the service but much of the time we are traveling somewhere where our cell phone no longer serves us. Perhaps we are a tourist in another country, or even just out driving or camping in a rural area. The technological advancements suggested in the second part of this story demonstrate a much more efficient method of wireless communication.

The San Francisco Zoo Guide application could be applied to any zoo or theme park in the world. A similar downloadable program could be offered at Disneyland, the Singapore Zoo, Great America, and more.

511.org is a wonderful concept for public transportation. They have already built all the infrastructure necessary to evolve into the downloadable application referred to here. The next step would be to make this program work on a Mobile Internet Device. A further feature might include the ability to track an individual's current location from GPS. It is real-time information, real-time decision-making, with the ability to incorporate fluctuating variables such as traffic into consideration.

The other chapters are available in the book. The book will be available soon in the leading book stores and on the web.

- i Peter Drucker book: Management Tasks - Responsibilities - Practices.
  - ii <http://www.ntia.doc.gov/broadbandgrants/>
  - iii Peter Drucker book: Management Tasks - Responsibilities - Practices.
  - iv [brainyquote.com](http://brainyquote.com)
  - v (<http://www.leonardo-da-vinci-biography.com>)
  - vi (<http://www.mos.org/leonardo>)
  - vii [http://entertainment.timesonline.co.uk/tol/arts\\_and\\_entertainment/books/article3579120.ece](http://entertainment.timesonline.co.uk/tol/arts_and_entertainment/books/article3579120.ece)
  - viii (<http://lakdiva.org/clarke/1945ww/>)  
[http://entertainment.timesonline.co.uk/tol/arts\\_and\\_entertainment/books/article3579120.ece](http://entertainment.timesonline.co.uk/tol/arts_and_entertainment/books/article3579120.ece)
  - ix (<http://www.hq.nasa.gov/alsj/a11/a11.landing.html>)
  - x [http://www.nasa.gov/audience/forstudents/58/features/F\\_Apollo\\_35th\\_Anniversary.html](http://www.nasa.gov/audience/forstudents/58/features/F_Apollo_35th_Anniversary.html)
  - xi <http://www.pbs.org/transistor/album1/index.html>
  - xii <http://www.eweek.com/c/a/Mobile-and-Wireless/MWC-Microsoft-CEO-Ballmer-says-Openness-Interoperability-the-Future-of-Mobile/?kc=EWKNLINF02202009STR1>
  - xiii [www.hughes.com](http://www.hughes.com)
  - xiv <http://www.intel.com/products/mid/>
  - xv <http://www.eweek.com/c/a/Mobile-and-Wireless/MWC-Microsoft-CEO-Ballmer-says-Openness-Interoperability-the-Future-of-Mobile/?kc=EWKNLINF02202009STR1>
  - xvi <http://en.wikipedia.org/wiki/CPU>
  - xvii <http://en.wikipedia.org/wiki/Netbook>
  - xviii <http://en.wikipedia.org/wiki/Nettop>
  - xix <http://www.intel.com/products/processor/atom/index.htm>
  - xx <http://www.intel.com/design/flash/nand/ssd-info-center.htm>
  - xxi *ibid*
  - xxii *ibid*
  - xxiii *wikipedia*
  - xxiv
  - xxv *wikipedia*
  - xxvi [http://www.usatoday.com/tech/wireless/2008-04-10-wifi\\_N.htm](http://www.usatoday.com/tech/wireless/2008-04-10-wifi_N.htm)
  - xxvii <http://www.muniwireless.com/2008/12/02/free-wi-fi-on-buses-between-heathrow-airport-and-reading/>
  - xxviii <http://www.wimaxforum.org/>
  - xxix <http://articles.latimes.com/2008/mar/25/business/fi-google25>
  - xxx <http://articles.latimes.com/2008/mar/25/business/fi-google25>  
[http://sports.yahoo.com/nfl/blog/shutdown\\_corner/post/Man-gets-27-000-phone-bill-after-watching-Bears;\\_ylt=AjVe0XPzKwr6jP.R3ESiNm8azJV4?urn=nfl,144070](http://sports.yahoo.com/nfl/blog/shutdown_corner/post/Man-gets-27-000-phone-bill-after-watching-Bears;_ylt=AjVe0XPzKwr6jP.R3ESiNm8azJV4?urn=nfl,144070)
- 
- xxxi *ibid*
  - xxxii <http://www.hughes.com/HUGHES/Rooms/DisplayPages/LayoutInitial?pageid=ProductsTechnologies>

History of 511: In 2001 the Federal Communications Commission designated 511 as the single travel information phone number for states and local jurisdictions across the country. Oregon joins a number of states, including Washington, with service available to dial 511.